

MIMULUS SHEVOCKII (SCROPHULARIACEAE), A NEW
SPECIES FROM DESERT HABITATS IN THE
SOUTHERN SIERRA NEVADA OF CALIFORNIA

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ABSTRACT

Mimulus shevockii, a new species in sect. *Paradanthus* from desert habitats in the southern Sierra Nevada of Kern County, California, is described and illustrated. Its corolla is unique: four upper lobes are small, entire, and maroon-purple; the lowest lobe is much larger, bifid, and bright yellow. Vegetative and pollen morphology of *M. shevockii* resembles members of the *M. rubellus* and *M. palmeri* groups of sect. *Paradanthus*.

Several collections of *Mimulus* dating back to 1932 were made in the desert region of the southern Sierra Nevada near Kernville. The specimens, which did not clearly show the corolla, remained unidentified or were tentatively assigned to *M. barbatus* Greene, a species of meadow borders or damp granitic sands primarily in Jeffrey pine forests of higher elevations on the Kern Plateau. James R. Shevock, intrigued by the striking difference in the two habitats, searched for and found the puzzling desert plants. He has supplied excellent field study notes, photographs, and specimens documenting the plants as a distinctive new species with a highly limited distribution. We are pleased to name the species in honor of this energetic and effective botanist who has contributed greatly to our knowledge of the plants of the southern Sierra Nevada.

Mimulus shevockii Heckard and Bacigalupi, sp. nov.

Herba annua minute glandulosa usque ad 12 cm alta. Folia sessilia amplectentia connataque lanceolato-ovata vel anguste ovata aliquantum succulenta concavaque. Flores axillares pedicellis 10–15 (–20) mm longis. Calyx vasiformis angulatus costis leviter incrassatis apud florem 4–6 mm apud fructum 6–7 mm longis dentibus 0.7–1.0 mm longis truncatis vel rotundatis saepe mucronulatis. Corollae tubus faucesque 8–12 mm longi, labiis usque ad 10–15 mm ampliatis; labium superiorum duobus brevibus rotundatis marronino-purpureis lobulis; labium inferiorum duobus lateralibus marronino-purpureis lobulis et unico lobo magno flavido leviter lato quam longo et 5–10 mm longo instructis. Stigmata ciliato-papillata et stamina ex ore corollae parum exsert (Figs. 1, 2).

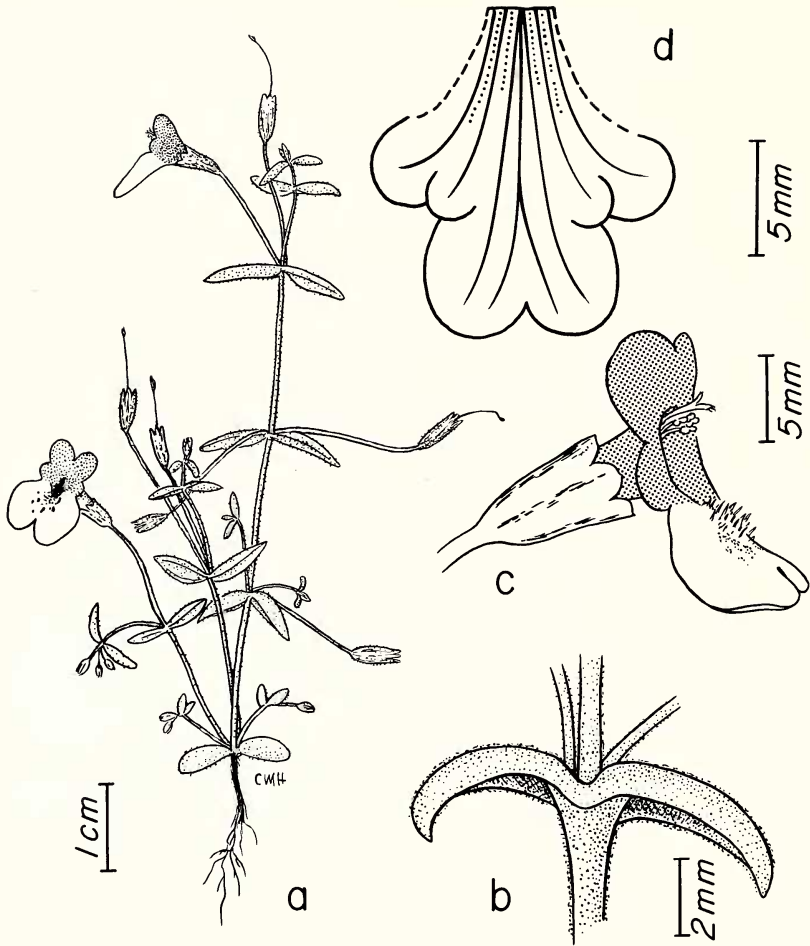


FIG. 1. *Mimulus shevockii*. a. Habit. b. Nodal region with lowermost pair of connate leaves. c. Flower. d. Corolla opened dorsally, showing major veins. From *Bacigalupi* 9446.

Minutely glandular-puberulent annual; stems erect to 12 cm, simple or branched at lowermost nodes. Cotyledons persistent, rotund to ovate, 5–10 mm long, the bases clasping. Leaves 1–10 pairs, sessile, the lowermost ovate to lanceolate, usually connate at base, 5–10 mm long, somewhat fleshy, purplish below and slightly concave with entire thickened margins, obscurely palmately veined with five (three in upper leaves) sunken veins; upper leaves reduced and narrowed, clasping but not connate at base, often reflexed with deflexed tip. Flowers axillary from first leaf node upward; pedicels 10–15(–20) mm long, exceeding internodes in length, ascending or becoming



FIG. 2. *Mimulus shevockii*. a. Flower, face view. b. Flower, side view. c. Habitat, region of Joshua tree woodland in Kelso Creek Valley, type locality.

divergent or declinate with upturned apices, mostly glabrous; calyx vase-shaped, angled, 4–7 mm long, elongating in fruit only slightly or not at all but becoming distended by maturing capsule, the ribs slightly thickened and often greenish-yellow with several elongated reddish spots or solid red, weakly glandular-puberulent; calyx teeth 0.7–1.0 mm long, rounded to acute, often mucronulate. Corolla bilabiate, tube-throat 8–12 mm long, the lips widely and unequally spreading 10–15 mm, upper lip with two short (3–5 mm) rounded (sometimes weakly mucronulate) maroon-purple lobes, the lower lip with two short (1–3 mm) lateral maroon-purple lobes (below the lobes of upper lip and appearing to be a part of it) and one large yellow bifid lobe 5–10 mm long, 8–15 mm broad; throat and base of lowermost lobe of lower lip with two palatal folds, maroon-purple spotted and bearded with trichomes up to 1 mm long; tube-throat maroon-purple distally, pallid below. Stamens glabrous, exserted 1–2(–4) mm, upper pair 4–6 mm long, lower pair 7–8 mm long, attached slightly lower in tube, anthers connivent in pairs, filaments dark red. Stigma exserted, slightly exceeding anthers, dark red, lobes

equal, irregularly ciliate-papillose, the style weakly puberulent below stigma, sometimes breaking proximally and leaving apiculation on mature capsule; capsule ellipsoid, 5–6 mm long, barely included in calyx-tube at maturity, dehiscent at apex and along both sutures, the placenta splitting to $\frac{1}{3}$ or less its length. Seeds many (more than 100), ellipsoid to ovoid, tan, faintly reticulate, ca. 0.5 mm long. Chromosome number $n = 16$.

TYPE: USA, CA, Kern Co.: w. side of Kelso Creek along dirt road to Cortez Canyon, n. of Kelso Creek, 1067 m, T27S R35E S34 w. $\frac{1}{2}$, 16 Apr 1983, *Shevock 10319* (Holotype: JEPS; isotypes: CAS, GH, MO, NY, RM, RSA, SBBG, US).

PARATYPES: USA, CA, Kern Co.: near Kernville, 12 Apr 1932, *Bangsberg s.n.* (JEPS); Cyrus Canyon, *Twisselmann 14087* (CAS, JEPS), *14097* and *17640* (CAS); Cyrus Canyon, e. of Sierra Way Rd., T26S R33E S6I, *Shevock 10267* (CAS, JEPS, SBBG), *Shevock 10327* (CAS, JEPS, RSA), *Norris 370* (CAS, JEPS); Kelso Creek, *Luthey 341-B* (CAS); Kelso Creek, w. side, along road to Cortez Canyon, T27S R35E S34, *Shevock 9321* (CAS, JEPS, RSA), *10266* (CAS, FSC, MO, NY, RSA), *10368* (CAS, JEPS, RSA); Kelso Creek, w. side, 1 mile nw. of Bird Spring Pass road junction, T27S R35E S28, *Shevock 10322* (CAS, JEPS, MO, RSA), *Norris 375* (JEPS), *Bacigalupi 9346* (JEPS), *Heckard 6225* (JEPS); Kelso Creek, w. side, just s. of Bob Rabbit Canyon, T27S R35E S20, *Shevock 10383* (CAS, JEPS, NY, RSA); Cortez Canyon, T28S R35E S05, *Shevock 10320* (CAS, JEPS, NY, RSA).

Distribution and ecology. *Mimulus shevockii* occurs predominantly in loamy, coarse sands on alluvial fans and deposits of granitic origin (Fig. 2c). The Cyrus Canyon population, however, grows on finer soils developed from metasedimentary rocks. All populations are within Joshua tree or California juniper woodlands, or their transition at 975–1250 m, with a mean annual precipitation of about 20 cm. Flowering occurs April–May.

Even though hundreds of hectares appear to contain suitable habitat, only six populations of *Mimulus shevockii* have been discovered, all within a relatively limited geographical area of the southern Sierra Nevada within the Kern River drainage in the Lake Isabella region. Five of the six populations are located at the northeast base of the Piute Mountains north of Kelso Peak within 3 km of Kelso Creek. A sixth population, collected by Ernest Twisselmann in 1968 and by Shevock in 1983 is disjunct about 22 km northwestward in Cyrus Canyon near Kernville.

Associated species (at all localities): *Anisocoma acaulis*, *Camissonia graciliflora*, *Canbya candida*, *Ephedra nevadensis*, *Eriogonum fasciculatum* subsp. *polifolium*, *Eriophyllum pringlei*, *Haplopappus linearifolius*, *Hymenoclea salsola*, *Linanthus aureus*, *L. parryae*, *Lu-*

pinus concinnus var. *orcuttii*, *Mimulus androsaceus*, *M. fremontii*, *Opuntia echinocarpa*, *Pectocarya penicillata*, *P. setosa*, and *Salvia dorrii*.

Relationships. According to the comprehensive treatment of the genus *Mimulus* by Grant (1924), *M. shevockii* belongs to sect. *Paradanthus*, a large group that she proposed to accommodate a diverse assemblage of species. Some of these species she admitted were quite unrelated and even possibly derived from different sections. The relationship of *M. shevockii* within the section is problematic. Its corolla is unique in lobe configuration and color pattern. The two lateral lobes of the lower lip are reduced and raised to a horizontal position (Fig. 1c) and are colored the same as the upper lip (rather than having the lips of separate colors as in other species with bi-colored corollas). Thus, only the much enlarged central lobe of the lower lip is yellow. Only one example of a similar color pattern is known and that was recently observed and photographed in *M. pulchellus* A. L. Grant (sect. *Oenoe*) at Yosemite National Park (S. Botti pers. comm.). The photographs show considerable variation in corolla ranging from the usual pattern (upper lip purplish and lower lip yellow) through intermediate conditions to corollas in which the lower lip has lateral lobes purplish and the central lobe yellow as in *M. shevockii*. This would seem to indicate that the color pattern in the corolla of *Mimulus* is more capable of evolutionary modification than previous evidence indicated.

Vegetative morphological features of *Mimulus shevockii* are close to those of species in the *M. rubellus* and *M. palmeri* groups as circumscribed and discussed by Grant (1924, p. 110–111). Several species (e.g., *M. androsaceus* Curran ex Greene, *M. barbatus* Greene, *M. gracilipes* Robinson, and *M. purpureus* A. L. Grant) in these groups are similar to *M. shevockii* in their small leaves with clasping-connate leaf bases, long and spreading to ascending pedicels, and calyx with short rounded, often mucronulate lobes. None of these species, however, has any hint of the unusual corolla features of *M. shevockii*. *Mimulus androsaceus*, which grows with *M. shevockii*, is remarkably similar in vegetative features, including a leaf that is purplish and marginally thickened abaxially.

Evidence from chromosome number for the relationship of *Mimulus shevockii* is minimal but does not negate a connection with those species of sect. *Paradanthus* that most resemble it vegetatively. The chromosome number for *M. shevockii*, kindly supplied by Dr. T-I. Chuang, is $n = 16$ (based on *Shevock 10322*). This number, along with $n = 8$, is the most common number in sect. *Paradanthus*, occurring in 13 of the 16 known counts (Vickery 1978, Heckard and Shevock 1985, Chuang and Heckard unpubl.). Three counts are

available for species of the *M. rubellus* and *M. palmeri* groups that vegetatively resemble *M. shevockii* and these are also $n = 8$ and 16 .

Pollen features also are equivocal. Argue (1980, letter 1985) considers pollen of *M. shevockii* to be Type IIb, indistinguishable from that of *M. barbatus* and similar to that of *M. rubellus* Gray and *M. discolor* Grant. These three species are in the *M. rubellus* group and are similar vegetatively to *M. shevockii*. *Mimulus dudleyi* Grant and *M. repens* R. Br., however, which are morphologically unrelated, also have very similar pollen of Type IIb. Less similar Type IIb pollen is known in six other species of sect. *Paradanthus*. Pollen of many taxa remains to be studied with SEM. Therefore, the systematic significance of pollen morphology remains unclear within sect. *Paradanthus*, but pollen data do not contradict deductions of relatedness from vegetative morphology.

Mimulus barbatus, which occurs in meadow borders at higher elevations in the nearby Kern Plateau, has been confused with *M. shevockii*, but the corollas of the two species are highly dissimilar, especially in shape. *Mimulus barbatus* also has a bicolored corolla, but the corolla lobes are each cleft and the upper lip of two lobes is reddish-purple (rather than maroon-purple) and the lower lip has three downward projecting yellow lobes. If *M. barbatus* is the closest relative to *M. shevockii*, then the corolla of the latter has evolved considerably. Another difference, although one in which *M. shevockii* has an intermediate condition in the section, is that the placenta of the dehiscent capsule splits to about $\frac{1}{3}$ its length whereas that of *M. barbatus* separates to near the middle.

The distinctive color pattern and lobe configuration of the corolla of *Mimulus shevockii* raises a question as to which lobes make up the two corolla lips. Our interpretation of what constitutes the upper and lower lips of the corolla is based on evidence from the venation of the corolla. In other *Mimulus* species examined, each of the five corolla lobes has a major vein from the base, thus two veins run to the two lobes of the upper lip and three to the three lobes of the lower lip. The four stamens each have a vein and these four veins alternate with those of the five corolla lobes except in the upper lip where the two lobe veins are adjacent due to the evolutionary loss of the fifth stamen in this position. In *M. shevockii* (Fig. 1d), two veins run between the veins of the upper stamens and clearly define the upper lip with its two lobes. The large emarginate lower lobe has one vein (dividing into three, then four, branches) and the two lateral lobes each have a major vein indicating that these three lobes with their three veins make up the lower lip.

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